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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,415	08/28/2001	Steven Alan Cordes	YOR920000827US1	4360

7590 07/27/2005
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EXAMINER

MCPHERSON, JOHN A

ART UNIT PAPER NUMBER

1756

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,415

Applicant(s)

CORDES ET AL.

Examiner

John A. McPherson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8,11,12 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16 is/are allowed.
- 6) ☒ Claim(s) 1,3-6,11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/4/05 has been entered.

2. The Amendment filed 5/4/05 successfully overcomes the rejections set forth in paragraphs 3-5 of the Office Action mailed 11/4/04. Accordingly, these rejections are withdrawn.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8, 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "the energy entrant portion" in line 5. There is insufficient antecedent basis for this limitation in the claim. This rejection could be overcome by replacing "the" with --a--.

Claim 8 recites the limitation "the support portion" in line 8. There is insufficient antecedent basis for this limitation in the claim. This rejection could be overcome by replacing "the" with --a--.

Claims 11 and 12 are included in this rejection only because they depend from indefinite claim 8.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-6, 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2001/0016924 (US '924). US '924 discloses an aperture plate and a process for making the same, the process comprises the steps of providing a silicon substrate; doping the silicon substrate with boron to form a boron-doped layer at the substrate surface, wherein the depth of the boron-doped layer represents the desired thickness of a membrane (about 1 to 3 μm); etching the rear surface of the silicon substrate to form support struts and a boron-doped membrane; and etching an aperture in the membrane. See the abstract and paragraphs [0035] to [0038]. However, US '924 does not teach the thickness for the support (i.e. frame member), or the doping concentration for the membrane or support of the present invention. It would have been obvious to one skilled in the requisite art to arrive at a support thickness of

625 micrometers, a membrane doping concentration of about 7×10^{19} atoms/cm³, and a support doping concentration of about 10^{16} atoms/cm³ because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges or value of a result effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

5. Claims 1, 3-6, 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-168049 (JP '049). JP '049 discloses a stencil mask and a method of manufacturing the same, the method comprising the steps of forming a boron doped layer with a depth of 2 micrometers and a concentration of 1×10^{20} atom/cm³ on the surface of a silicon wafer, forming an etching mask having a desired pattern on the back side of the wafer, etching the wafer to form a support portion and a boron doped membrane, forming a protective film on the membrane, etching apertures in the membrane, and removing the protective film. See the abstracts, paragraphs [0029] to [0035] of the computer-generated translation mailed with this Office Action, and Figures 2-3. However, US '924 does not teach the thickness for the support (i.e. frame member), or the doping concentration for the support of the present invention. It would have been obvious to one skilled in the requisite art to arrive at a support thickness of 625 micrometers and a support doping concentration of about 10^{16} atoms/cm³ because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges or value of a result effective variable

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involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

6. Claims 1, 3-6, 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,972,794 (US '794). US '794 discloses a silicon stencil mask and a method of manufacturing the same, the method comprising the steps of forming a boron-doped layer preferably 1.5 to 2.5 μm thick and with a dopant concentration of approximately 1×10^{20} atoms/cm³ on a silicon substrate, forming a mask pattern on the boron-doped layer, etching the boron-doped layer to form voids which do not extend completely through the boron-doped layer, etching away the silicon substrate to form struts, and etching the boron-doped layer completely through. See the abstract and column 3, line 11 to column 4, line 41. However, US '794 does not teach the thickness for the support (i.e. frame member), or the doping concentration for the support of the present invention. It would have been obvious to one skilled in the requisite art to arrive at a support thickness of 625 micrometers and a support doping concentration of about 10^{16} atoms/cm³ because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges or value of a result effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

7. Claim 16 is allowed because in a process for fabrication of an energy passing aperture structure as set forth in the present invention, the prior art does not teach or suggest the steps of forming a through-hole alignment pattern and doping both the above side and the below side of the wafer.

Response to Arguments

8. Applicant's arguments filed 5/4/05 have been fully considered but they are not persuasive. Applicant argues that the applied prior art does not recognize the need for a frame member forming epitaxial supporting contact with the second surface of a membrane layer, however each of the applied references discloses forming the membrane layer by doping the surface of a silicon wafer with boron, as in the present invention. Therefore, the underlying silicon wafer which forms the support struts (i.e. frame member) of the prior art is inherently in epitaxially supporting contact with the second surface of the boron-doped membrane layer. This is clear from the disclosure of the prior art references, accordingly an affidavit is not required. The formation of an oxide layer in US '294 (Yahiro) is not related to the formation of the frame-membrane interface, but is instead directed to the subsequent photolithographic patterning and etching of the wafer.


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571)

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272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John A. McPherson
Primary Examiner
Art Unit 1756

JAM
7/23/05